

S))Q

7-1

7-1. INTRODUCTION.

(5 minutes)

Note. Show Slide 1.

- a. **Reason.** After the completion of TWGSS training, crews must ensure that TWGSS equipment is operational, clean, and properly packed prior to turn-in. They must also return the tank and its fire control system (FCS) to normal mode of operation.

Note. Show Slide 2.

- b. **Training Objective.** Given an M1/M1A1 tank with BII and TWGSS installed, you will conduct post operational tasks and after operation PMCS on TWGSS IAW TM 9-6920-709-12&P-1-1, Chapters 2 and 3. You will also return the tank and its FCS to normal mode IAW TM 9-2350-288-10-1/2.
- c. **Procedure.** During this block of instruction, we will cover the post operational tasks and after operation PMCS associated with TWGSS, the tank, and its FCS. You will be assigned an assistant instructor for the practical exercise portion of the class. You will use the appropriate TMs to conduct these tasks.

7-2. CONFERENCE/DEMONSTRATION/PRACTICAL EXERCISE.

(50 minutes)

- Notes.
- 1. The primary instructor now releases the student crews to their assigned assistant (small group) instructors for the practical exercise portion of this lesson.
 - 2. Prior to students arrival, ensure an assistant instructor is assigned to each training station.
 - 3. Direct students to their appropriate training station.
 - 4. Each assistant instructor is to conduct a safety briefing for his small group IAW Appendix B.
 - 5. Whenever possible, have the students serve as demonstrators during small group instruction. Have one student read the procedures while another student performs the task. To ensure all students get equal hands-on time, rotate the reading and performance responsibilities.
 - 6. The assistant instructor discusses and clarifies the procedure as required and reinforces the training objective.
 - 7. Show proper use of DA Form 2404 to report faults found during inspection of TWGSS components.
 - 8. Show proper use of DA Form 2402 to tag faulty components found during inspection of TWGSS components.
- a. **Post Operational Tasks.** Working as a crew, perform the following post operational tasks after completion of TWGSS training, using TM 9-6920-709-12&P-1-2:
 - (1) Conduct BIT.
 - (2) Remove TWGSS components.

7-2. CONFERENCE/DEMONSTRATION/PRACTICAL EXERCISE (Con't).

- (3) Clean and inspect TWGSS components IAW after operation PMCS.
- (4) Return tank and FCS to normal mode of operation.
- (5) Turn in TWGSS set.

b. **Conduct BIT.** Upon completion of training and prior to removal of the equipment, the crew conducts BIT to ensure the system is functional. Faulty components are identified for repair.

- (1) Set gun/turret drive (GTD) switch to MANUAL.
- (2) Turn on tank master power.
- (3) Turn on turret power.
- (4) Turn on utility switch on TNB.
- (5) Perform BIT IAW TM 9-6920-709-12&P-1-2, Chapter 2.
- (6) If BIT passes, continue with removal.
- (7) If BIT fails, troubleshoot IAW TM 9-6920-709-12&P-1-2, Chapters 3 and 4.

c. **Remove TWGSS Components.**

Caution. Do not clean tank with high pressure water when TWGSS is installed. Damage to units and components can occur.

Note. Explain to the students that as TWGSS components are removed, they are placed in the storage cases for later cleaning and inspection. If units are extremely dirty, they must be cleaned prior to removal so they can be placed in cases.

- (1) Position main gun over right side number two road wheel.

Warning. Ensure that main gun is locked to turret roof, turret traverse lock is engaged, GTD switch is set to MANUAL, and vehicle master power switch is in OFF position prior to removal of components. Injury to personnel or damage to components could occur.

- (2) Secure main gun elevation lock. Engage turret traverse lock.
- (3) Place vehicle master power switch and turret power switch in OFF position.
- (4) Place utility power switch in OFF position.
- (5) Remove interior cables and components.

Caution. When connecting or disconnecting cables to tank use extreme care. If you have not been trained in the following task, notify your immediate supervisor for assistance.

- (a) **Disconnect W9 cable (power).** Disconnect W9 power cable connector UJ1 from utility jack connector UJ1. Install protective cover on utility jack UJ1 connector.

7-2. CONFERENCE/DEMONSTRATION/PRACTICAL EXERCISE (Con't).

- (b) Remove Hoffman Device cables.

Warning. DO NOT connect Improved Tank Gunfire Simulator (Hoffman Device) unless vehicle master power switch is in OFF position and simulator safety switch is in OFF position, with key removed. Failure to follow this warning may result in injury or death to personnel.

Note. Perform the following steps only if Hoffman Device is installed on tank.

1. Disconnect W16 cable connector HOFFMAN TRIGGER from Hoffman Device cable connector HOFFMAN TRIGGER.
2. Disconnect W9 cable connector HOFFMAN POWER from Hoffman Device cable connector HOFFMAN POWER.
3. Disconnect W9 cable connector HOFFMAN GROUND from Hoffman Device cable connector HOFFMAN GROUND.

- (c) Disconnect W8 cable and TIS junction box.

Caution. When connecting or disconnecting tank cables, use extreme caution. If you have not been trained in the following task, notify your immediate supervisor for assistance.

1. Disconnect TIS cable connector J2 from TIS junction box connector J1.

Caution. When connecting or disconnecting tank cables, use extreme caution. If you have not been trained in the following task, notify your immediate supervisor for assistance.

2. Disconnect W8 cable connector J3 from TIS junction box connector J3. Install protective caps on junction box connectors.
3. Disconnect TIS cable connector J2 from TIS junction box connector J1.
4. Connect TIS cable connector J2 to TIS control panel connector J2.

- (d) Remove W16 cable.

Caution. When connecting or disconnecting tank cables, use extreme caution. If you have not been trained in the following task, notify your immediate supervisor for assistance.

1. Disconnect W16 cable connector J1 from blasting machine cable #BMACH-P1.
2. Disconnect W16 cable connector J2 from turret cable #1W203-8/31 at cable support bracket.

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3. Connect blasting machine cable #BMACH-P1 to turret cable #7W203-8/31 at cable support bracket to right of TIS control panel.

(e) Remove W14 cable.

Caution. When connecting or disconnecting tank cables, use extreme caution. If you have not been trained in the following task, notify your immediate supervisor for assistance.

1. Disconnect W14 cable connector J6 from alternate data bus coupler connector J6. Install protective cover on connector J6.
2. Remove cable bundle containing W8, W9, W14, and W16 cables from right turret wall and from behind commander's seat. Coil cable bundle and secure with velcro straps.

(f) Remove LRF node assembly.

1. Remove FCEU protective cover from turret floor using 9.16 in. socket (see TM 9-2350-288-10-1).

Caution. When connecting or disconnecting tank cables, use extreme caution. If you have not been trained in the following task, notify your immediate supervisor for assistance.

2. Disconnect turret cables from FCEU connectors J3 and J4.
3. Disconnect LRF node assembly from FCEU connector J12.
4. Disconnect turret cable #1W202-8/P1 from LRF node assembly.
5. Connect turret cable #1W202-8/P1 to FCEU connector J12.
6. Disconnect W11 cable connector J1 from LRF node assembly connector J1. Remove LRF node assembly from turret.
7. Connect turret cables disconnected from FCEU connectors J3 and J4 to FCEU connectors J3 and J4.

(g) Remove W11 cable.

Caution. When connecting or disconnecting tank cables, use extreme caution. If you have not been trained in the following task, notify your immediate supervisor for assistance.

Disconnect W11 cable connector TJ2 from FCEU connector TJ2. Install protective cover on connector J2.

7-2. CONFERENCE/DEMONSTRATION/PRACTICAL EXERCISE (Con't).

- (h) Remove W15 cable.

Caution. When connecting or disconnecting tank cables, use extreme caution. If you have not been trained in the following task, notify your immediate supervisor for assistance.

Disconnect W15 cable connector J1 from primary data bus coupler connector J1.
Install protective cover on connector J1.

- (I) Remove W10 cable.

1. Lift AM1780/VRC audio frequency amplifier cover and disconnect W10 cable audio input and ground cable leads from amplifier terminals. Close cover.
2. Loosen audio frequency amplifier lower right mounting nut and remove ground lead from under washer. Tighten nut.
3. Disconnect W10 cable connector J1 and W11 cable connector J2 from loader's panel.
4. Remove cable bundle containing W10, W11, and W15 cables from left turret wall and from behind loader's position. Coil cable bundle and secure with velcro straps.

- (j) Remove loader's panel.

Remove loader's panel from tank.

- (k) Install FCEU protective cover.

Install FCEU protective cover on turret floor using 9/16 in. socket (see TM 9-2350-288-10-1).

- (l) Remove vehicle interface assembly.

1. Release all velcro straps and collect all cables in a bundle.
2. Lift vehicle interface assembly out of .50 cal. ammo box.
3. Disconnect W3 cable from TBOS video mixer unit connector J2.
4. Disconnect control panel cable from vehicle interface unit connector J1.
Remove control panel from tank.
5. Remove vehicle interface assembly from tank.

7-2. CONFERENCE/DEMONSTRATION/PRACTICAL EXERCISE (Con't).

(6) Remove exterior cables.

(a) Remove W3 cable.

1. Disconnect W3 cable connector J1 from remote system interface (RSI) assembly.
2. Remove grommet and W3 cable from loader's hatch periscope mount.
3. Release velcro straps and remove W3 cable.

(b) Remove W6 cable.

1. Disconnect W6 cable connector J4 from target computer unit.
2. Disconnect W6 cable connector J1 from left-front retro detector unit.
3. Disconnect W6 cable connector J1 from left-rear retro detector unit.
4. Release velcro straps and remove W6 cable.

(c) Remove W5 cable.

1. Disconnect W5 cable connector J3 from target computer unit.
2. Disconnect W5 cable connector J1 from right-front retro detector unit.
3. Disconnect W5 cable connector J1 from right-rear retro detector unit.
4. Release velcro straps and remove W5 cable.

(d) W12 Cable.

1. Disconnect W12 cable connector J1 from target computer unit connector J1.
2. Disconnect W12 cable connector J2 from remote system interface (RSI) connector J2.
3. Remove W12 cable from bustle rack.

(e) Remove W2 cable.

Disconnect W2 cable connector J1 from RSI assembly connector J1.

7-2. CONFERENCE/DEMONSTRATION/PRACTICAL EXERCISE (Con't).

(f) Remove W7 cable.

1. Disconnect W7 cable connector J3 from TBOS driver unit.
2. Disconnect W7 cable connector J1 from TBOS GAS assembly.
3. Release velcro straps and remove W7 cable.

(g) Remove W1 cable.

1. Disconnect W1 cable connector J2 from TBOS driver unit.
2. Disconnect W1 cable connector J1 from transceiver unit.
3. Release velcro straps and remove W1 cable.

(7) **Remove exterior components.**

(a) Retro detector assembly (right- and left-rear).

1. Lift locking handle.
2. Remove retro detector assemblies from right- and left-rear turret bustle rack.

(b) Target computer assembly.

1. Lift locking handle.
2. Remove target computer assembly from right-rear bustle rack railing.

(c) RSI assembly.

1. Lift locking handle.
2. Remove RSI assembly from left-rear bustle rack.

(d) Hull defilade detector unit (right- and left-front). Remove right and left-front hull defilade detector units.

(e) Retro detector assembly (right- and left-front).

1. Lift locking handle.
2. Remove right- and left-front retro detector assembly from upper bustle rack railing.

(f) TBOS GAS assembly.

1. Loosen locking nut using 13 mm open end wrench from BII.

7-2. CONFERENCE/DEMONSTRATION/PRACTICAL EXERCISE (Con't).

2. Remove TBOS GAS assembly from GAS optical port.

(g) TBOS driver assembly.

1. Lift locking handle.

2. Remove TBOS driver assembly from top bracket on gun mantle.

(h) Transceiver unit.

1. Lift locking handle to unlocked position.

2. Remove transceiver unit from muzzle of main gun.

d. Clean and Inspect TWGSS Components.

(1) **General PMCS Procedures.** If any deficiencies are discovered during visual inspection ensure you:

(a) Consult TM 9-6920-709-12&P-1-2, Chapter 3 to determine if component is considered Not Mission Capable (NMC).

(b) Tag the component with the problem discovered, using DA Form 2402.

(c) Report the failure on DA Form 2404.

(d) Return the component to Training Support Center (TSC).

Caution. When cleaning components, ensure only authorized cleaning materials are used. Failure to use the correct supplies can lead to premature failure of components.

Caution. Do not use high pressure water to clean the equipment due to the risk of equipment damage.

(2) **General cleaning and inspection checks.** Perform the following general cleaning and inspections checks for all external and internal components:

(a) Wipe unit with a soft rag. Moisten rag with water if required.

(b) Visually inspect components for damaged or missing parts.

(c) Inspect connectors for damage, foreign objects, and bent or damaged pins.

(d) Verify all decals and markings are present and legible.

(e) Lubricate all moving parts of mounting brackets with CLP (See Appendix A).

(f) Install all dust caps before packing assemblies in storage cases.

7-2. CONFERENCE/DEMONSTRATION/PRACTICAL EXERCISE (Con't).

(3) Cleaning and inspection of exterior components.

(a) Transceiver unit.

Caution. Always ensure that transceiver unit locking handle is locked to 120mm adapter. Failure to follow this caution may result in transceiver unit falling out of adapter and becoming damaged.

1. Check lens for damage or cracks.
2. Clean lens with lens paper moistened with lens cleaning compound.
3. Inspect expansion rings for damage.
4. Check that moisture indicator is blue or light blue. Red or pink indicates moisture.

Note. Transceiver unit will rattle (if gently shaken) if shock sensor is tripped.

5. Check if shock sensor has not been tripped.
6. Inspect 120 mm adapter for damage.

Note. Transceiver unit is placed into 120mm adapter prior to storage.

(b) TBOS driver assembly.

1. Check that moisture indicator color is blue or light blue. Red or pink indicates moisture.
2. Check rubber pads for damage.
3. Inspect protective bag for damage.

(c) TBOS GAS assembly.

1. Check optics for damage or cracks.
2. Clean optics with lens paper moistened with lens cleaning compound.
3. Check rubber pads for damage.
4. Visually check for moisture inside unit.

(d) Target computer assembly.

1. Check that moisture indicator color is blue or light blue. Red or pink indicates moisture.
2. Inspect rubber pads for damage.
3. Inspect protective bag for damage.

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(e) Retro detector assembly (right- and left-front).

1. Check reflectors and detectors for damage or cracks.
2. Clean reflectors and detectors with a rag moistened with water.
3. Check strobe light for damage.

(f) Hull defilade detector unit (right- and left-front).

1. Check detectors for damage or cracks
2. Clean detectors with a rag moistened with water.
3. Inspect cable for damage.

(g) Retro detector assembly (right- and left-rear).

1. Check reflectors and detectors for damage or cracks.
2. Clean reflectors and detectors with a rag moistened with water.
3. Check strobe light for damage.
4. Inspect rubber pads of mounting bracket for damage.

(h) RSI Assembly.

1. Check that moisture indicator color is blue or light blue. Red or pink indicates moisture.
2. Inspect rubber pads of mounting bracket for damage.
3. Inspect protective bag for damage.
4. Inspect antenna and cable for damage.
5. Inspect connectors for damage and bent or damaged pins.

(4) **Cleaning and inspection of interior components.**

(a) LRF node assembly. Clean and inspect IAW general cleaning and inspection instructions.

(b) Loader's panel. Check pushbuttons for damage.

(c) TIS junction box.

1. Inspect J1 connector cap for damage.
2. Check that moisture indicator color is blue or light blue. Red or pink indicates moisture.

7-2. CONFERENCE/DEMONSTRATION/PRACTICAL EXERCISE (Con't).

(d) Vehicle interface assembly.

Note. Vehicle interface assembly consists of vehicle interface unit; TBOS video mixer unit; expansion unit; W4, W8, W9, W10, W11, W13, W14, W15, and W16 cables; and vehicle interface assembly bracket.

1. Check that moisture indicators color is blue or light blue. Red or pink indicates moisture.
2. Check that each unit is securely attached to bracket.
3. Inspect cables for damage.
4. Inspect cable connectors on units and both ends of cables for damage, foreign objects, and bent or damaged pins.
5. Inspect cables for damaged or missing dust caps.
6. Inspect cables for damaged or missing velcro straps.

(e) Control panel.

1. Clean display screen with lens paper moistened with lens cleaning compound.

Note. Moisture indicator is located in upper right corner of display screen.

2. Check that moisture indicator color is blue or light blue. Red or pink indicates moisture.
3. Check pushbuttons for damage.
4. Inspect cable for damage.
5. Inspect cable for damaged or missing dust cap.
6. Check that eject button moves freely.

(f) Loader's hatch grommet. Clean and inspect IAW general cleaning and inspection instructions.

(5) **Cleaning and inspection of cables.**

Note. The remaining cables are W1, W2, W3, W5, W6, W7, W11, and W12.

(a) General cleaning and inspection checks. Perform the following general cleaning and inspection checks for all cables:

1. Wipe cables with a soft rag moistened in water.
2. Inspect cable material for damage.
3. Inspect for damaged or missing dust caps.

7-2. CONFERENCE/DEMONSTRATION/PRACTICAL EXERCISE (Con't).

4. Inspect connectors for damage, foreign objects, and bent or damaged pins.
5. Verify all labels and markings are present and legible.
6. Inspect cables for missing or damaged velcro straps.
7. Install all connector dust caps before packing cables in storage case.

- (b) W2 cable. Inspect for missing or damaged magnets (3 each).
- (c) W3 cable. Inspect for missing or damaged magnets (2 each).
- (d) W11 cable. Inspect for damaged circuit box.

(6) Cleaning and inspection of storage cases.

Caution. Ensure insides of storage cases are dry prior to storage. Moisture inside storage cases could damage components.

- (a) Wipe cases with a soft rag.
- (b) Inspect latches for damage and missing parts.
- (c) Inspect hinges for damaged and broken parts.
- (d) Inspect handles for damage and missing parts.
- (e) Verify decals and markings are present and legible.

e. Return Tank and Fire Control System (FCS) to Normal Mode of Operation.

(1) **FCS data.** Enter the following values into FCS IAW TM 9-2350-288-10-1/2.

- (a) Enter original computer correction factors.
- (b) Enter original ammunition subdesignation.
- (c) Set crosswind sensor back into operation.

(2) **FCS self-test.** Perform FCS self-test to verify that system is operational after connection of tank cables.

(3) **Installation of tank-specific equipment.**

- (a) Install the loader's periscope.

Warning. Ensure that main gun is locked to turret roof, turret traverse lock is engaged, and GTD switch is set to MANUAL prior to working around or under gun.

- (b) Install FCEU protective guard under main gun.
- (c) Install muzzle plug on main gun.

7-2. CONFERENCE/DEMONSTRATION/PRACTICAL EXERCISE (Con't).

f. Turn in TWGSS Set.

- (1) Inspect and clean all TWGSS equipment.
- (2) Dry all equipment prior to storage.
- (3) Store all components properly in storage cases.
- (4) Tag and turn in unserviceable or damaged components.

Note. Only TSC personnel are authorized to repair or replace faulty components IAW Maintenance Allocation Chart in TM 9-6920-709-12&P-1-2, Appendix B.

7-3. FINAL REVIEW. (5 minutes)

a. Student Questions.

Note. Show Slide 3.

b. Summary of Main Teaching Points.

- (1) BIT
- (2) Removal of TWGSS
- (3) After operation PMCS
- (4) Tank and FCS to normal mode of operation
- (5) Turn in of TWGSS set

Note. Show Slide 4.

- c. **Closing Statement.** This block of instruction has prepared you to remove, clean, inspect and turn in TWGSS components, as well as perform tank checks and procedures. You should now be proficient in conducting the post operational procedures associated with training with TWGSS.

APPENDIX A TO LESSON PLAN 7

POST OPERATIONAL PROCEDURES

TOOLS, EQUIPMENT, AND MATERIALS

Listed equipment is one per tank crew.

1. M1A2 series tank with BII and TWGSS installed
2. TM 9-6920-709-12&P-1-2
3. TM 9-2350-288-10-1/2
4. Expendable/durable items (see Appendix D, TM 9-6920-709-12&P-1-2)
5. DA Form 2404
6. DA Form 2402

APPENDIX B TO LESSON PLAN 7

POST OPERATIONAL PROCEDURES

SAFETY

Listed general safety regulations are to be strictly enforced during the performance of this lesson.

1. Mount and dismount tank over left front fender.
2. Maintain three points of contact while on top of tank.
3. No smoking within 50 m of tank.
4. Do not go over or under gun tube.
5. Ensure gun/turret drive (GTD) switch is set to MANUAL position during installation/removal, alignment, troubleshooting, and before leaving the turret.
6. Ensure vehicle master power switch is in OFF position during removal of TWGSS components.
7. Ensure turret power switch is in OFF position during removal of TWGSS components.
8. Ensure TNB utility power switch is in OFF position during removal of TWGSS components.
9. No cables should be connected or disconnected by untrained personnel.

**APPENDIX C
TO LESSON PLAN 7**

POST OPERATIONAL PROCEDURES

VIEWGRAPHS
